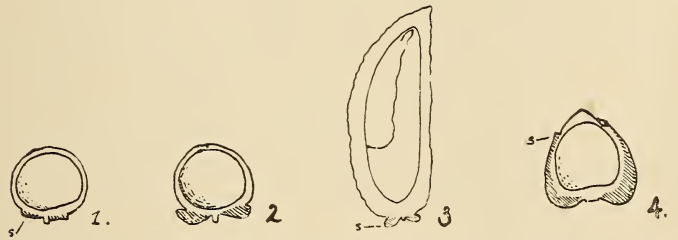
Notes on Dipterocarps.

No 6. On the genus Pachynocarpus.

By I. H. Burkill and F. W. Foxworthy.

Pachynocarpus is a small genus of the natural order Dipterocarpaceae, with its nearest affinity to the somewhat polymorphic genus *Vatica*. If *Vatica* be divided into two or more genera, then *Pachynocarpus* is abundantly distinct; but if, as several botanists think, *Vatica* in its variety is still rightly considered a single genus, then it is a debateable point whether *Pachynocarpus* should be kept apart from it. It was defined in 1860 by Sir Joseph Hooker (Trans. Linn. Soc. XXIII., p. 159) upon material collected by James Motley in Borneo and sent by Mr. E. S. Barber* of the Eastern Archipelago Company to Sir William Hooker at Kew from Labuan. *Vatica* had been defined long before,—first in 1771 by Linnaeus (Mantissa II, p. 152) upon a specimen from Ceylon (mislabelled China); then it had been recognized as appearing in the Philippine Islands in a second species (Blanco, Fl. Filip., ed. 1, 1837, p. 401) and in the islands of Borneo and Sumatra in two more species (Blume, Mus. Bot., 1852, p. 31). To these have been added other species up to the number of 55,



Figs. 1 and 2, the shells of two fruits of *Vatica Wallichii* gathered from under the same tree in the Tasek Gelugor Forest Reserve, Province Wellesley, showing extremes in the development of the calyx (shaded): 3, a fruit of *Vatica ridleyana* in vertical section: 4, shell of the fruit of *Pachynocarpus umbonatus* in vertical section. All reduced to one-half and in all the calyx shaded. The cotyledons are indicated in 3.

* The Director of the Royal Botanic Gardens, Kew, kindly informs us that Edmund Scott Barber was Resident Director of the Eastern Archipelago Company at Labuan at the time of the murder of Motley (see Jour. Straits Branch, Roy. Asiatic Soc. No. 79, 1918, p. 37) and purchased at the sale of Motley's effects, the latter's herbarium. Under the date Nov. 16th, 1859, he wrote to Sir William Hooker at Kew, telling him this and that he would forward the herbarium; and explained that Motley when alive had intended to do so. He also offered a collection of mosses. In a second letter he stated that Motley's herbarium consisted of about 400 specimens, and advised the sending to Kew of numerous small packets of mosses and "a remnant of Motley's herbarium not arranged."

with a distribution from Ceylon to New Guinea, and northwards as far as the eastern extremity of the Himalaya. More or less in the middle of the area occupied by Vaticas occurs *Pachynocarpus.*

From the species of *Vatica* nearest to it, the first described *Pachynocarpus,—P. umbonatus,*—differs in the degree of adnation of the calyx, as the diagrams above indicate.

Upon this adnation Hooker defined the genus: and in 1862 in the *Genera Plantarum* (i., p. 192), he remarked succinctly that *Pachynocarpus* differs in no other way from *Vatica,* of which genus but seven species were known to him. Alphonse de Candolle in 1868 (Prodromus, XVI, part 2, p. 605) retained *Pachynocarpus,* altering the definition by pointing out that the stamens may be 15 in number, instead of 10, as had been stated. Burck, nineteen years later (Ann. Jard. Bot. Buitenz. VI, 1887, p. 223), sunk the genus to the position of a section of *Vatica,* at the same time describing as a new species *Vatica verrucosa.* Heim followed (Recherches sur les Diptérocarpacées, Paris, 1892, p. 107) with the restoration of *Pachynocarpus,* and with a subdivision of *Vatica.* Sir George King (Journ. As. Soc. Beng., LXII, 1893, p. 136) took Heim's view; and at the same time he transferred *Vatica Wallichii,* Dyer, and *Vatica ruminata,* Burck, to *Pachynocarpus,* in a way which we find wrong, and he added a new species, —*P. Stapfianus.* Sir Dietrich Brandis, the last comprehensive writer upon the order, followed suit (Journ. Linn. Soc. Bot. XXXI, 1895, p. 136): he placed the species as King had done, except that he did not reduce *Vatica ruminata,* but called it *Pachynocarpus ruminatus.* He had described a *Vatica Ridleyana* (Hooker's Icones t. 2401), which, from its obviously close relationship to *Vatica Wallichii,* Dyer, Ridley in the Singapore herbarium, and as a follower King, transferred to the genus *Pachynocarpus:* and this transference appeared in Mr. James Anderson's "*Index of Plants, Botanic Gardens, Singapore*" as *P. Ridleyana,* but wrongly ascribed to Brandis. The result of all these writings is that we have six names under Pachynocarpus:—

P. umbonatus, Hook. f.;

P. verrucosus, Heim, transferred from the genus Vatica, where it stood as *V. verrucosa,* Burck;

P. Wallichii, King, including *Vatica Wallichii,* Dyer;

P. Stapfianus, King;

P. ruminatus, Brandis, submerged from *V. ruminata,* Burck, by King into *P. Wallichii,* but restored to *Pachynocarpus* by Brandis; and

P. Ridleyanus, J. W. Anderson, transferred from *Vatica Ridleyana,* Brandis.

Burck had described a *Vatica obtusa* (l.c., p. 228) placing it next to *V. ruminata* with the remark "anne rectius *V. ruminatae* varietas." If so near *V. ruminata* as that and if *V. ruminata* is a species of *Pachynocarpus,* then so also must this species be; and therefore we may have seven to deal with.

For our work we have borrowed the specimens left in the herbarium of the Royal Botanic Gardens, Calcutta, by Sir George King, and examined them carefully, along with the material which we have been able to accumulate ourselves from within the Malay Peninsula. The result is a great reduction and a return towards older views. While reserving an opinion upon the advisability of retaining *Vatica* as it stands, we cut out of *Pachynocarpus* most of the species added to it. We consider *P. verrucosus,* Heim, unlikely to differ from one of the other species of the genus: *P. Wallichii,* King, to consist of *Vatica Wallichii,* Dyer, and a *Pachynocarpus* confused; *P. Stapfianus* not to differ from the second part of King's *P. Wallichii*: *ruminatus* to be the same as *Vatica Wallichii*: and *P. Ridleyanus* to be a Vatica likewise. Moreover we find at present no reason to keep up the two species *Vatica obtusifolia,* Ridley, and *V. Kelsalli,* Ridley, described in the Journal of the Straits Branch of the Royal Asiatic Society, No. 34, 1910, pp. 26-27: both appear to be *Vatica Wallichii,* Dyer.

In the Calcutta herbarium are two sheets of *Pachynocarpus umbonatus* from the "Herbarium Hookerianum" with flowers; and in a capsule upon one of them is a detached fruit. It is clear that they were part of the material upon which the species was described. Attached to one of the sheets is a fragment of Chinese paper bearing this note:—"160, Dipterocarpeae—? Vatica. A tree 1 to 1½ feet diameter; wood very hard close and lasting, when cut yellowish brown, turning nearly black on drying; bark smooth, light coloured; yields a yellow transparent copal-like resin. The gum called in Europe "dutch copal." Rassak bunga—flowering rassak; blooms cream-coloured, said to be very showy; tinged with pink when in blossom; very sweet scented. Loobook dana." In the Transactions of the Linnean Society the wood of *Pachynocarpus* was described by Sir Joseph Hooker, not as in this note, but as soft and white, and the wood of *Cotylelobium melanoxylon* Hook. f. which is also called "rassak" § was described as yellow, when seasoned turning black. Both species are said by him to have been got upon the north coast of Labuan, but Mr. T. H. Eley now Resident at Labuan, is unable to ascertain for us that there is a bay or stream-bend there, known at Lubok dana: and we are not confident that Lubok dana cannot be for instance on the Sungei Banyu Irang in Banjermassin. The note quoted appears to have been Motley's. It is to be asked not only if Sir Joseph Hooker wrongly assumed Lubok dana to be in Labuan, but why the discrepancy in the description of the wood, or if the note has been placed upon a wrong sheet, and belongs to *Cotylelobium melanoxylon*: but then the number 160 Hooker gives to the other. Sir George King had these specimens before him when he wrote his account of *Pachynocarpus.* It is to be observed that he held his material of *Pachynocarpus* from the Malay Peninsula to differ from

§ "Rapak" the name quoted by Hooker is an error—a misreading of the word "rassak" written by Motley with the first s long.

them; and his opinion always deserves consideration: but beyond that he went wrong in not seeing that the peninsular material was different from the really unlike *Vatica Wallichii.*

In considering whether King was right to keep apart that Malayan material from the Bornean type, and right also to distinguish specifically *P. Stapfianus,* we have met with much difficulty. We have ended in keeping the peninsular and the Bornean material apart, more from caution than from conviction, and find the Pachynocarpus-portion of King's *P. Wallichii* not separable specifically from his *P. Stapfianus.* If however, there is a confusion in Motley's specimens, and it can be of a *Vatica* in flower mixed with a *Pachynocarpus* in fruit (flowers and fruit were probably gathered months apart), then the flowering specimen is likely to be a flowering *Vatica* and perhaps *V. Wallichii,* while the fruiting specimen (which is *P. umbonatus*) *may* not differ from *P. Stapfianus.* More study in Borneo is needed to decide this both near Labuan, and because Motley's last years were at Banjermassin in the south east.

At flowering time there is no sure mark in a herbarium specimen by which *Pachynocarpus* can be distinguished from *Vatica Wallichii.* That led to King's mistake of identifying the two; and a fair measure of variability in the calyx caused him to think that the adhesion which is not visible in the flower, came quite late in fruit-development, whereas it commences from the fall of the petals. The diagrams printed above indicate some of the variation in the calyx. We have had good opportunities of studying *Vatica Wallichii* alive, because it is a tree cultivated in the Economic Garden, Singapore, and because also it is by no means uncommon round the coasts of the Malay Peninsula. It has been planted on dry ground in the Economic Garden and has grown well; but its natural habitat is upon ground liable to flooding. Herbarium specimens prove its occurrence down the west coast of the Peninsula, certainly from Province Wellesley, and possibly from Trang in Lower Siam, to Singapore; and down the east coast from Kuantan to Singapore. It, by being identified with Burck's *Vatica ruminata,* is known also from Bangka. It is possible that Dr. Haviland's flowering specimens, Nos. 1907 and 1908, from near Kuching, Sarawak, may be it; but fruits are necessary for making this sure.

To Malays it is one of the several trees called Resak. Resak paya (swamp resak) is a name for it in Pahang and so are Resak pasir (pasir may mean sand, sea beach, or a certain quality in a wood which causes it to take the edge off cutting tools) and Resak laru,* which last belongs also to *Pachynocarpus Stapfianus.* Goodenough, Ridley's collector, called it Damar Mata Kuching on specimens collected in Singapore island and in Malacca. Derry in Malacca called it Kayu Merbatu Pasir.

* Laru is a substance used in making sugar. In this particular case, it is said that punctures or cuts are made in the bark; the resin which exudes is collected and placed into syrup which is being boiled, causing it to harden into sugar with a yellow colour.

The wood of *Vatica* and *Pachynocarpus* seems to be very much alike. The sapwood of *Vatica Wallichii* is white or pale yellow and the heartwood is brownish yellow, becoming much darker after exposure to the air. There is less of resin in the wood than is usually found in most members of the order.

A pale damar runs out of injuries and glazes over the stem.

The tree attains no great height, reaching say 60 feet and the spread of its branches is narrow, say 10 feet from the trunk. If grown in the open it keeps its lower branches and is then leafy nearly to the ground; but in high forest its trunk is straight and branchless to 30 feet or more. A tree 50 feet high may possess a diameter at breast height of 20-30 inches. The bark is light grey and smooth.

Its times of flowering in Singapore are uncertain doubtless in response to the uncertainty of the weather. All trees flower together. Flowering however in the Peninsula seems to be most common in April or May.

Individual trees differ from each other in small points. The leaves of some dry darker than the leaves of others. The flowers vary from a pale cream to milk-white; in some there is a touch of red upon the outside of the bud; examined at sun-down the petals may be bent just to a right angle on their claw, in others more. These variations characterise whole trees. It may be that the trees whose flowers are most pigmented, are the trees whose leaves dry darkest; but this has not been proved. A flower whose petals are bent through a right angle is figured below. The small eye is noteworthy.

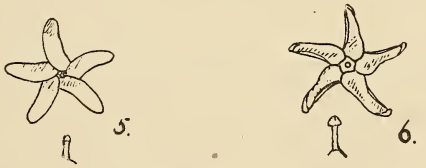


Fig. 5 on the left, a flower of *Vatica Wallichii* in face view: Fig. 6 on the right, a flower of *Vatica Ridleyana*, also in face view. Both nat. size. Below each is the stigma and style enlarged.

The flowers have a strong and pleasant scent. By their multitude they make the tree conspicuous at flowering. They open about dawn, and fall about the next dawn. The stamens number 15;—if 10 in such plants as that upon which *Vatica Kelsalli* was founded, then so by reduction, accidental probably. The flowers face downwards and outwards chiefly. Three or four distinct patches of glandular tissue occur in a row upon the underside of the leaves where the lateral veins break into loops. These leaves last for about 3 years. Six months pass before the fruit is ripe. The fruit is dry and water-distributed chiefly by means of floods. We have seen this process in operation in the Tasek Gelugor Forest Reserve in Province Wellesley, where heavy rain had flooded the

low and level ground, and the fruits were stranded in lines at the limit of the flooding. The duration of the floating was tested and described in a note by one of us (Journ. Straits Branch Roy. As. Soc. 81, 1920, p. 75) where the wrong generic name *Pachynocarpus* was used for it. The average duration of floating in that experiment was found to be 22 days. The germination was described in the same place. The capsule is ruptured along three lines predetermined by weaknesses in the walls. These three lines are more clearly shown in the capsule of the related *Vatica Zollingeriana*, A. DC., which is figured here, because it is instructive in regard to the nature of the less clearly marked lines of rupture in *Vatica Wallichii*.

Fig. 7. Shell of the fruit of *Vatica Zollingeriana*, A.DC., in vertical section showing the sepals (s), and the wall cut on one side down one of the lines of rupture, and on the other through the thick swollen mid-part between. Doubtless *V. Zollingeriana* is water-distributed, for the swollen part is such as would keep it floating.

The fruiting calyx of *V. Wallichii* is developed to a somewhat variable extent: sometimes it is humped as in the first figure above; sometimes it is rather flat, as in the second. The two figures were from fruits picked from the ground of the Tasek Gelugor Forest Reserve at the same spot, and appeared to be the product of a tree immediately above them.

Our material of *Vatica Wallichii* is as follows:—

Province Wellesley. In the Tasek Gelugor Forest Reserve, with fruit, in September 1921, *Burkill 6599!*

Penang. Without precise locality, *Wallich Cat. 9018!*

Perak. Ulu Sapetang, with young fruit in Feb. 1909, *M. Hashim 238!;* Larut, within 100 ft. of sea level in dense jungle, with young fruit in January 1884, *King's Collector 5423!;* on low hills, with fruit in February 1884, *King's Collector 5546!;* Briah upon the Larut plain, with young fruit in December 1892, *Wray 4223!;* banks of the Bernam river at 300-400 ft., with young fruit, in April 1886, *King's Collector 8857!*

Pahang. Temerloh, with fruit in November 1921, *Awang Lela 5470!;* Kuantan in the Baloh Forest Reserve, with fruit in March 1920, *Yeob 873!;* Kelebor near Kuala Rompin, with fruit in April 1921, *Bidin 4182!*

Selangor. Kelamber Forest Reserve near Klang, in swamp with fruit in September 1919, *Hamid and Yeob, 3295!*

Malacca. Without locality, in flower and with young fruit, *Maingay 201!;* Sungei Udang, with fruit in July, 1894, *Goodenough 1968!*

Johore. Kuala Sembrong, with fruit in October 1892, *Lake and Kelsall!;* Kota Tinggi, on the riverside, with fruit in December 1892, *Ridley!*

Singapore. Kranji with fruit in 1893, *Goodenough!;* Changi, with flowers and detached fruit in May 1889, *Goodenough!;* in flower and with half ripe fruit in April 1893, *Ridley 4740!,* and with flowers and fruit in May 1889, but fruit detached and may not be of this date, *Ridley 1839!;* Toas with fruit in March 1893, *Goodenough 5075!;* Tampinis road, with young fruit, in (? April) 1893, *Ridley 4739!;* Botanic Gardens in flower March 1916, November 1919, January 1921 and in fruit October 1916, July 1921, *Burkill 1077!, 1265!, 1267!, 1266!, 1270!, 5969!, 5970!, 5971!, 5972!, 5973!, 6434!, 6435!, 6436!*

Bangka. Without precise locality (the type of *V. ruminata* Burck) *Teysmann!* cult. in Hort. Bog. VII, c. 4a with fruit, No. 204! and with flowers and fruits, *van Slooten!*

It is exceedingly probable that the following also belong to *Vatica Wallichii,* but they lack fruit.

Lower Siam. Trang upon the bank of the river, in dense jungle, with flowers in March 1881, *Kunstler 1437!*

Province Wellesley. Nibong Tebal with flowers, in January 1900, *Curtis 3458!* (part of which is the type of *V. ovalifolia*, Ridl.).

Perak. Larut in open jungle with flowers in September 1884, *King's Collector, 6594!,* and in May 1884, *King's Collector 6070!, 5763!*

Pahang. Kuantan, with flowers, in June 1921, *Mohamad 3733!;* at the Chini Lake with flowers in April 1919, *Lambak 3173!;* on the Rompin river in the Menchali Forest Reserve, with flower in May 1919, *Foxworthy 3232!*

Malacca. Sungei Udang with flowers in 1892, *Derry 961!*

Johore. Penyabong, with flowers in May 1918, *Foxworthy 1197!;* Skudai river with flowers in August 1879, *King!;* Jaffaria with flowers in August 1879, *King!*

Singapore. Pulau Seletar in flower, 1892, *Ridley 4942!* and in flower April 1892, *Ridley 6202!,* and in 1894, *Ridley 6205!;* Chan Chu Kang by a stream, in flower in October 1892, *Ridley 4449!;* Changi in flower in May 1889, *Goodenough!;* Tampinis in flower in April 1916, *Burkill!*

Vatica Ridleyana is a species which occurs in a state of nature in the Botanic Gardens, Singapore, where it flowers and fruits at rather wide intervals. It may be that a specimen in the herbarium of the Royal Botanic Gardens, Calcutta, collected on Bukit Timah in Singapore island, is also *Vatica Ridleyana,* but as it is without

the characteristic fruits it is impossible to make sure of this: it was collected in 1894: in 1892 Mr. Ridley got the species on Bukit Mandai (No. 8943) and also at Changi (Nos. 4447! and 4448!), since which dates clearing has been extensive; and the tree has not been recognised in recent years outside the Botanic Gardens. In the Gardens there are several individuals. The tallest is in area N, tree No. 795: the second tree No. 815 in area V, and others are in area U and V. It is not a tree of lowlying ground; and its large fruits sink at once in water. Such distribution as they get must be by being rolled along the floor of the forest or (and this is the usual distribution of many forest trees of the second rank) by transport through small distances by animals seeking food.

Tree No. 795 in the Botanic Gardens is about 100 feet high. Its trunk is 62 in. in circumference at breast height: the bark is medium grey. The spread of the branches is about 30 feet from the trunk, the lower 60 feet of which are straight smooth and branchless.

The flower drawn above was produced by tree 815 in January 1921; and fruits were not ripe until the following November. They fell very deliberately through three months or more.

Fig. 8. A half ripe fruit of *Vatica moluccana*, Burck, showing the development of the reflexed calyx. The fruit is figured to illustrate a stage in the series of species connecting *Vatica Wallichii* with Vaticas of the section Retinodendron.

The fruit of *Vatica Ridleyana*, if elongated, is always turned to one side as drawn; but tree No. 815 produces longer fruits by ¾ in. than tree No. 795, in which the apex is nearly straight. The leaves have glandular patches just as those of *Vatica Wallichii*.

These glands are slightly concave, and carry brown hairs.

The spongy parenchyma of the lower surface of the leaf gives place over their area to something denser. No excretion has been observed to occur on them; but probably there is one.

Pachynocarpus umbonatus, by the view taken here, is the tree of Borneo sent by Barber to Sir William Hooker at Kew,—certainly the fruiting part of the specimens, but not quite so certainly the flowering part. These flowering branches show thinner leaves with less prominent veins than any peninsular specimen which we ascribe to the genus. And as leaves so thin seem to be within the range of variation of the leaves of *Vatica Wallichii;* and as

dried flowers offer no character by which the two can be distinguished, it is well not to state dogmatically yet that *P. umbonatus* and *P. Stapfianus* are distinct species.

Pachynocarpus verrucosus, (Burck) Heim, described upon a specimen from Sungei Landak in Borneo, north east of Pontianak, collected by Teysmann, will probably be united with one of the other species when fully studied.

Pachynocarpus Stapfianus is like *Vatica Ridleyana* a tree of rising land. The result is that flowering herbarium specimens unauthenticated by fruits, if from the interior of the Peninsula, are more likely to be it than the similar *Vatica Wallichii*. We know it to occur in the Siamese Malay States, Penang, Perak, Selangor, and Pahang. King's Collector records it as 80-100 ft. high, with a girth up to 3 ft. As it occurs at Bangi, Selangor, it is a tree 38 ft. 2 in. high, and 3 ft. 1 in. in girth at breast height. The height to the first branch is 6 ft. 4 in., and the girth just below the first branch 2 ft. 11 in. The spread of the crown is 26 ft. 4 in.

We have not measurements of any other trees. Its leaves in most cases dry dark as in some specimens of *Vatica Wallichii*, so that by their colour there is no means of separating the two when dry. Of the flower in life we are not able to give a figure. We have records of flowering in July and October in different places and different years: and of fruiting in January, February, April and July.

The fruit when half ripe is acute to blunt; and when fully ripe by the rounding of the fertile loculus becomes globose and generally loses the minute apiculus representing the style. It has not the dimensions ascribed to it by Sir George King in any of the type specimens but is about one inch long. The calyx is adherent through $\frac{1}{2}$-$\frac{2}{3}$ of the length of the fruit. It and the exposed surface of the carpellary wall above it are lenticellate, sometimes little, sometimes much. The tip of the sepals persists and is free until the fruit is half ripe, then it generally falls off. The months when fruit is most likely to be found are March, April and May.

The embryo is quite unlike that of *Vatica Wallichii*. The outer cotyledon is half-wrapped half-folded round the placentar cotyledon: and both reach the apex of the fruit cavity:

Figs. 9 and 10, the embryo of *Pachynocarpus stapfianus* $\frac{1}{2}$ nat. size.

Our material of *Pachynocarpus Stapfianus* is as follows:—

Lower Siam. Tapli Klong Wan towards the Tenasserim border in fruit in March 1919, *Hamid 3781!*

Kedah. Lankawi island, at Sungei Batu Asah, in fruit February 1911, *Mohamed Haniff 15553!*

Penang. Telok Bahang, at 500 ft., with fruits in July, 1888, *Curtis 1161* in one part!; Batu Feringgi in fruit without any date, *Forest Guard!;* Government Hill at 500 ft., with flowers in February 1887, *Curtis 1161* in the other part!, and in April 1890, with flower and fruit in March 1900 (obviously date of flowering; date of fruit uncertain) *Curtis A!;* Bukit Penara, with flowers and detached fruit, in March, *Curtis 1391!*

Perak. Larut, in open jungle at 300-850 ft., in April 1885, *King's Collector 7466!;* Gopeng in open jungle, in April 1884, *King's Collector 5932!,* and in open jungle with fruit in May 1884, *King's Collector 6132!,* September 1885, *King's Collector 8186!* near the Bernam river at 300-400 ft. with fruit in April 1886, *King's Collector 8857!*

Selangor. Bangi, with fruit in January 1920 and with flower in October 1921, *Forest Guard Ahmat 5008!*

Pahang. Baloh Forest Reserve, Kuantan District, in fruit in March 1919, *Forest Guards Yeop and Abdul Rahim 3145!* (a condition having the fruit so covered with lenticels that it appears different, and it is possible that when more fully known it will have to be distinguished.)

Flowering specimens which seem to be *Pachynocarpus Stapfianus* but cannot be assigned to it positively are King's collector's No. 6594 from Larut, 500-800 ft., with flowers in September 1884, his No. 5763 from Gopeng with flowers in April 1884, his No. 6070 from Gopeng, with flowers in May 1884, Curtis' No. 1218 from Sungei Penang Road at 1,000 ft. (doubtless the more western Sungei Penang of the two in the island of Penang); another collected by Curtis, without number, in September 1887, from the Experimental Nursery at 2,000 ft. on Government Hill, Penang, and a third with flowers in August 1880; King's collector's further specimens from the Bernam river bearing his number 8753, having been got in flower in April 1886; and lastly Barnes' No. 10872 from Kluang Terbang at 5,000 ft. on Gunong Benom, Pahang, with buds.

Maisak is the Siamese name for this tree, and it is a Resak to the Malays. Resak laru is a name from Kuantan and also from Penang.

Our conclusion is that *Pachynocarpus* stands with two or possibly three species, i.e. *P. umbonatus*, Hook. f., possibly *P. verrucosus,* Burck, and *P. Stapfianus*, King; but that *P. umbonatus* must be collected again to remove some doubt as to the correct identification of the flowering specimens with the fruit. The rest of the species put by various authors into the genus go to *Vatica.*